

PATENT ABSTRACTS OF JAPAN

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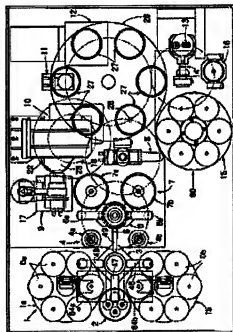
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(54) APPARATUS FOR PRODUCING DISK

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a disk production apparatus which is capable of preventing the intrusion of air bubbles into an adhesive, shortening the time for bonding and is suitable for automation as well as a substrate supplying device and a substrate transporting device.

SOLUTION: A pair of disk substrates Da and Db are supplied from a pair of substrate supplying sections 1a and 1b of the substrate supplying device 1. While a pair of the disk substrates Da and Db are rotated at a low speed by a pair of low-speed spin sections 4a and 4b of a low speed spin device 4, the adhesive is imparted to the substrate to a ring form. A pair of the disk substrates Da and Db are rotated at a high speed by a pair of high-speed spin sections 7a and 7b of a high-speed device 7 to uniformly disperse the adhesive. A pair of the disk substrates Da and Db uniformly dispersed with the adhesive are bonded to each other under a reduced pressure atmosphere, by which the disk is formed. The disk is pressurized from its both surfaces by a disk pressurizing device 11 and the adhesive is cured by an adhesive curing device 12.



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CLAIMS

[Claim(s)]

[Claim 1]In a disk manufacturing installation which pastes together one disc substrate and a disc substrate of another side with adhesives, and manufactures a disk, A substrate feed zone of another side which while supplies said one disc substrate and supplies a substrate feed zone and a disc substrate of said another side, A substrate feeder which ****, and a low-speed spin part which is giving said adhesives steadily to ring shape on the surface while carrying out the low speed rotary of said one disc substrate, A low-speed spin part of another side which gives adhesives to ring shape on the surface while carrying out the low speed rotary of the disc substrate of said another side, A low-speed spinning device which ****, and the 1st conveying machine that conveys a disc substrate of aforementioned one side and another side from said substrate feeder to said low-speed spinning device, A high-speed spin part which said adhesives carry out [spin part] the high velocity revolution of said one [which was given to ring shape] disc substrate, and is distributing said adhesives steadily uniformly, A high-speed spinning device which has a high-speed spin part of another side which carries out the high velocity revolution of the disc substrate of said another side where said adhesives were given to ring shape, and distributes said adhesives uniformly, and the 2nd conveying machine that conveys a disc substrate of aforementioned one side and another side from said low-speed spinning device to said high-speed spinning device, A laminating apparatus which pastes together said one [by which said adhesives were distributed uniformly] disc substrate, and a disc substrate of said another side where said adhesives were distributed uniformly under a decompressed atmosphere, The 3rd conveying machine that conveys a disc substrate of aforementioned one side and another side from said high-speed spinning device to said

laminating apparatus, A disk pressurizer which pressurizes a disk which pasted together a disc substrate of aforementioned one side and another side with said laminating apparatus, and formed it from the both sides, A disk manufacturing installation provided with an adhesive setting device which hardens said adhesives of said disk by which pressure treatment was carried out with said disk pressurizer.

[Claim 2]A rotating table which rotates a substrate feed zone of aforementioned one side and another side, respectively, Two or more poles which it is allocated by said rotating table on the same circumference, and said two or more disc substrates are inserted in it, and are stored in it, The disk manufacturing installation according to claim 1 provided with a lifter arm which one in said disc substrate inserted in said each pole is raised along with said pole, and is delivered to said 1st conveying machine. [two or more]

[Claim 3]The disk manufacturing installation according to claim 1 or 2, wherein a substrate feed zone of aforementioned one side and another side has further an electrostatic blowing device which static electricity is removed from an adhesive application side of said disc substrate, and is defecated, respectively.

[Claim 4]Said 1st conveying machine allocates in the common axis of rotation two or more transportation arms which have the function to hold said disc substrate, and. An adhesives supply arm which has a nozzle which carries out the regurgitation of said adhesives is provided in said axis of rotation, Conveying operation of said one disc substrate from said one substrate feed zone to said one low-speed spin part, Conveying operation of a disc substrate of said another side from a substrate feed zone of said another side to a low-speed spin part of said another side, And the disk manufacturing installation according to any one of claims 1 to 3 constituting so that repetitive rotating operation of said axis of rotation may perform alignment operation which locates said nozzle in either of the low-speed spin parts of aforementioned one side or another side selectively.

[Claim 5]It has further a spacer accumulation apparatus which collects from said substrate feeder spacers formed among said disc substrates stored in said substrate feeder, and is accumulated, The disk manufacturing installation according to claim 4 at least one of said two or more transportation arms receiving and holding said spacer from said substrate feeder, and conveying said spacer to said spacer accumulation apparatus by rotating operation of said axis of rotation.

[Claim 6]A transportation part which said 3rd conveying machine reverses said one [which was taken out from said one high-speed spin part] disc substrate, and is steadily conveyed to said laminating apparatus, The disk manufacturing installation according to any one of claims 1 to 5 having a transportation part of another side

conveyed to said laminating apparatus without reversing a disc substrate of said another side taken out from a high-speed spin part of said another side.

[Claim 7]A vacuum housing which has an opening of a couple which estranges said laminating apparatus of each other and counters, Each movable valve body which may blockade said each opening from those outsides, and each valve driving which drives said each movable valve body and changes a state of obstruction and an opened condition of each of said opening, Each disk holder which is provided in the inner surface side of each of said movable valve body, enabling free movement, and holds a disc substrate of aforementioned one side and another side, An exhaustor style which exhausts an inside of said vacuum housing in the state where said each opening was blockaded by said each movable valve body, and is made into a reduced pressure state, Each electrode-holder drive mechanism which drives said each disk holder located in an inside of said vacuum housing in a reduced pressure state and to which the adhesion sides of each of said disc substrate are joined, The disk manufacturing installation according to any one of claims 1 to 6 provided with a vent mechanism in which a reduced pressure state of said vacuum housing is canceled.

[Claim 8]Said disk holder of one side of the openings of said couple, When it is fixed and provided to said movable valve body and the adhesion sides of each of said disc substrate are joined, without forming said electrode-holder drive mechanism, The disk manufacturing installation according to claim 7 moving only said disk holder of one side of others of the openings of said couple.

[Claim 9]The disk manufacturing installation comprising according to claim 7 or 8: Said movable valve body of the upper part which an opening of said couple is mutually arranged due to up-and-down, and blockades said upper opening. Said valve driving of the upper part which drives a movable valve body by the side of besides.

Said disk holder of the upper part provided in the inner surface side of a movable valve body of said upper part enabling free movement.

An upper part solid of revolution to which two or more preparations and said further two or more upper part assemblies have been arranged on the same circumference, and were attached in an upper part assembly which comprises said electrode-holder drive mechanism of the upper part which drives a disk holder by the side of besides, Upper part solid-of-revolution drive mechanism which rotates a besides side solid of revolution and locates selectively one of movable valve bodies of two or more of said upper parts above an opening of said upper part.

[Claim 10]The disk manufacturing installation comprising according to any one of claims 7 to 9:

Said movable valve body of the bottom which an opening of said couple is mutually arranged due to up-and-down, and blockades said lower opening.

Said disk holder of the bottom provided in a movable valve body of this bottom.

A bottom solid of revolution to which two or more preparations and said further two or more bottom assemblies have been arranged on the same circumference, and were attached in a ***** assembly.

Bottom solid-of-revolution drive mechanism which rotates this bottom solid of revolution and in which one of movable valve bodies of two or more of said bottoms is selectively located under the opening of said bottom, and said valve driving of the bottom which drives a movable valve body of said bottom located under the opening of said bottom.

[Claim 11]By attaching a disk holder of said bottom to a movable valve body of said bottom, enabling free attachment and detachment, and inserting said disk holder in a central hole of said disc substrate as much as possible densely, The disk manufacturing installation according to claim 10, wherein alignment at the time of said disc substrate being positioned to a movable valve body of said bottom, and pasting together a disc substrate of aforementioned one side and another side is made.

[Claim 12]Disk test equipment which conducts a predetermined inspection to said disk by which curing treatment was carried out with said adhesive setting device, The disk manufacturing installation according to any one of claims 1 to 11 having further a disk accumulation apparatus which accumulates said disk inspected by this disk test equipment.

[Claim 13]A substrate feeder which supplies a disc substrate of aforementioned one side and another side in order to paste together one disc substrate and a disc substrate of another side characterized by comprising the following with adhesives and to manufacture a disk.

While supplies said one disc substrate and it is a substrate feed zone.

A substrate feed zone of another side which supplies a disc substrate of said another side.

A rotating table which rotates a substrate feed zone of a preparation, aforementioned one side, and another side, respectively.

Two or more poles which it is allocated by said rotating table on the same circumference, and said two or more disc substrates are inserted in it, and are stored in it, A lifter arm

delivered to a substrate transport device for raising one in said disc substrate inserted in said each pole along with said pole, and conveying said disc substrate. [two or more]

[Claim 14]The substrate feeder according to claim 13, wherein a substrate feed zone of aforementioned one side and another side has further an electrostatic blowing device which static electricity is removed from an adhesive application side of said disc substrate, and is defecated, respectively.

[Claim 15]In order to paste together one disc substrate and a disc substrate of another side with adhesives and to manufacture a disk, In a substrate transport device which said one disc substrate is conveyed from a substrate feeder to one low-speed spin part, and conveys a disc substrate of said another side from said substrate feeder to a low-speed spin part of another side, A transportation arm which is having steadily the function to hold said one disc substrate, A transportation arm of another side which has the function to hold a disc substrate of said another side, The axis of rotation in which an adhesives supply arm in which a nozzle which carries out the regurgitation of said adhesives was provided, said one transportation arm, a transportation arm of said another side, and all the arms of said adhesives supply arm were attached, A preparation, conveying operation of said one disc substrate from said substrate feeder to said one low-speed spin part, Conveying operation of a disc substrate of said another side from said substrate feeder to a low-speed spin part of said another side, And a substrate transport device performing alignment operation which locates said nozzle in either said one low-speed spin part or a low-speed spin part of said another side selectively by repetitive rotating operation of said axis of rotation.

DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention]This invention relates to the device for manufacturing the disk which is a kind of archive media, such as information and an image.

[0002]

[Description of the Prior Art]Conventionally, as a method of pasting the disc substrate of a couple together and manufacturing disks, such as DVD, as shown in drawing 8, After giving adhesives to the center portion of one disc substrate Da from the nozzle 5 at ring shape and laying the disc substrate Db of another side on top of this disc substrate Da, a high velocity revolution is carried out, and the method of making adhesives

spread uniformly and pasting them together is proposed and put in practical use.

[0003]Other disk manufacturing methods are shown in JP,H10-233042,A, and this method, After giving adhesives to ring shape between the disc substrate Da and Db with the nozzle 5, making the disc substrate Da of a couple, and Db counter, and making it rotate relatively with a low speed under ordinary pressure as shown in drawing 9, it is the method of sticking by pressure and pasting together. This method of pasting together is characterized by not making adhesives useless by applying optimum dose of adhesives.

[0004]The method of pasting together to JP,63-144440,A and JP,H2-128335,A under decompression of the disc substrate of the couple which applied adhesives is proposed. Drawing 10 shows the device for enforcing the method of pasting together under this decompression.

The bottom part 71 is fixed in the vacuum chamber 70, and above this bottom part 71, gone up and down type 72 is arranged so that rise and fall are possible.

[0005]The disc substrate Da to which adhesives were applied is laid in the bottom part 71, and the disc substrate Db by which adhesives were applied also to gone up and down type 72 is held. And after exhausting the inside of the vacuum chamber 70 with the vacuum pump 73 and considering it as a reduced pressure state, gone up and down type 72 is dropped, and the upper disc substrate Db is pressed to the downward disc substrate Da, and it pastes up.

[0006]

[Problem(s) to be Solved by the Invention]However, various kinds of conventional technologies mentioned above have a problem which each describes below.

[0007]First, in the method of pasting disc substrates together by the high velocity revolution shown in drawing 8, when pasting the disc substrate of another side together on the adhesives applied to one disc substrate, there is a problem that air bubbles will mix. If it pastes together especially at high speed, even if many minute air bubbles will mix into adhesives and it will spread adhesives by a high velocity revolution, air bubbles will remain in adhesives. There is also a problem that it takes time to pile up and carry out the high velocity revolution of the disc substrate of a couple, and to make adhesives spread uniformly. In order to aim at shortening of this spread time, the method of carrying weight on a disk and rotating, etc. are proposed.

[0008]How to paste together the former shown in drawing 9 is characterized by not making adhesives useless by applying optimum dose of adhesives like the above. That is, moreover this method of pasting together makes fixed thickness distribute the given

adhesives without excess and deficiency all over a disk, and is considered to be the method of requiring quite advanced art and skill. Since complete process cycles, such as removal of the set of a disc substrate, an adhesive application, sticking by pressure, and a lamination disk, are performed on one stage, a tact time becomes long and is considered to be inferior in respect of mass production nature.

[0009]Since how to paste together the former shown in drawing 10 performs removal of the disc substrate Da, the set of Db, lamination, and a lamination disk on one stage in the vacuum chamber 70, the tact time of a production line becomes long and cannot say it as a method suitable for automation of lamination.

[0010]since the problem of cellular mixing to adhesives and the tact time of lamination are long in a Prior art as mentioned above, there is a problem of not being suitable for automation.

[0011]Then, the purpose of this invention can prevent mixing of the air bubbles to adhesives, and it is pasted together, can shorten time, and there is in providing a disk manufacturing installation suitable for automation, a substrate feeder, and a substrate transport device.

[0012]

[Means for Solving the Problem]In a disk manufacturing installation which this invention pastes together one disc substrate and a disc substrate of another side with adhesives, and manufactures a disk, A substrate feed zone of another side which while supplies said one disc substrate and supplies a substrate feed zone and a disc substrate of said another side, A substrate feeder which ****, and a low-speed spin part which is giving said adhesives steadily to ring shape on the surface while carrying out the low speed rotary of said one disc substrate, A low-speed spin part of another side which gives adhesives to ring shape on the surface while carrying out the low speed rotary of the disc substrate of said another side, A low-speed spinning device which ****, and the 1st conveying machine that conveys a disc substrate of aforementioned one side and another side from said substrate feeder to said low-speed spinning device, A high-speed spin part which said adhesives carry out [spin part] the high velocity revolution of said one [which was given to ring shape] disc substrate, and is distributing said adhesives steadily uniformly, A high-speed spinning device which has a high-speed spin part of another side which carries out the high velocity revolution of the disc substrate of said another side where said adhesives were given to ring shape, and distributes said adhesives uniformly, and the 2nd conveying machine that conveys a disc substrate of aforementioned one side and another side from said low-speed spinning device to said high-speed spinning device, A laminating apparatus which pastes together said one [by

which said adhesives were distributed uniformly] disc substrate, and a disc substrate of said another side where said adhesives were distributed uniformly under a decompressed atmosphere, The 3rd conveying machine that conveys a disc substrate of aforementioned one side and another side from said high-speed spinning device to said laminating apparatus, It had a disk pressurizer which pressurizes a disk which pasted together a disc substrate of aforementioned one side and another side with said laminating apparatus, and formed it from the both sides, and an adhesive setting device which hardens said adhesives of said disk by which pressure treatment was carried out with said disk pressurizer.

[0013] Preferably a substrate feed zone of aforementioned one side and another side, A rotating table rotated, respectively and two or more poles which it is allocated by said rotating table on the same circumference, and said two or more disc substrates are inserted in it, and are stored in it, It has a lifter arm which one in said disc substrate inserted in said each pole is raised along with said pole, and is delivered to said 1st conveying machine. [two or more]

[0014] A substrate feed zone of aforementioned one side and another side has further preferably an electrostatic blowing device which static electricity is removed from an adhesive application side of said disc substrate, and is defecated, respectively.

[0015] Preferably, said 1st conveying machine allocates in the common axis of rotation two or more transportation arms which have the function to hold said disc substrate, and. An adhesives supply arm which has a nozzle which carries out the regurgitation of said adhesives is provided in said axis of rotation, Conveying operation of said one disc substrate from said one substrate feed zone to said one low-speed spin part, It constitutes so that repetitive rotating operation of said axis of rotation may perform conveying operation of a disc substrate of said another side from a substrate feed zone of said another side to a low-speed spin part of said another side, and alignment operation which locates said nozzle in either of the low-speed spin parts of aforementioned one side or another side selectively.

[0016] It has further a spacer accumulation apparatus which collects from said substrate feeder spacers preferably formed among said disc substrates stored in said substrate feeder, and is accumulated, At least one of said two or more transportation arms receives and holds said spacer from said substrate feeder, and it conveys said spacer to said spacer accumulation apparatus by rotating operation of said axis of rotation.

[0017] A transportation part which said 3rd conveying machine reverses said one [which was taken out from said one high-speed spin part] disc substrate, and is preferably conveyed steadily to said laminating apparatus, It has a transportation part

of another side conveyed to said laminating apparatus, without reversing a disc substrate of said another side taken out from a high-speed spin part of said another side. [0018]A vacuum housing which has preferably an opening of a couple which estranges said laminating apparatus of each other and counters, Each movable valve body which may blockade said each opening from those outsides, and each valve driving which drives said each movable valve body and changes a state of obstruction and an opened condition of each of said opening, Each disk holder which is provided in the inner surface side of each of said movable valve body, enabling free movement, and holds a disc substrate of aforementioned one side and another side, An exhaustor style which exhausts an inside of said vacuum housing in the state where said each opening was blockaded by said each movable valve body, and is made into a reduced pressure state, It has each electrode-holder drive mechanism which drives said each disk holder located in an inside of said vacuum housing in a reduced pressure state and to which the adhesion sides of each of said disc substrate are joined, and a vent mechanism in which a reduced pressure state of said vacuum housing is canceled.

[0019]Preferably said disk holder of one side of the openings of said couple, When it is fixed and provided to said movable valve body and the adhesion sides of each of said disc substrate are joined, without forming said electrode-holder drive mechanism, only said disk holder of one side of others of the openings of said couple is moved.

[0020]Said movable valve body of the upper part which an opening of said couple is mutually arranged due to up-and-down, and blockades said upper opening preferably, Said valve driving of the upper part which drives a movable valve body by the side of besides, and said disk holder of the upper part provided in the inner surface side of a movable valve body of said upper part enabling free movement, An upper part solid of revolution to which two or more preparations and said further two or more upper part assemblies have been arranged on the same circumference, and were attached in an upper part assembly which comprises said electrode-holder drive mechanism of the upper part which drives a disk holder by the side of besides, It has upper part solid-of-revolution drive mechanism which rotates a besides side solid of revolution and locates selectively one of movable valve bodies of two or more of said upper parts above an opening of said upper part.

[0021]Said movable valve body of the bottom which an opening of said couple is mutually arranged due to up-and-down, and blockades said lower opening preferably, Said disk holder of the bottom provided in a movable valve body of this bottom, A bottom solid of revolution to which two or more preparations and said further two or more bottom assemblies have been arranged on the same circumference, and were

attached in a ***** assembly, It has bottom solid-of-revolution drive mechanism which rotates this bottom solid of revolution and in which one of movable valve bodies of two or more of said bottoms is selectively located under the opening of said bottom, and said valve driving of the bottom which drives a movable valve body of said bottom located under the opening of said bottom.

[0022] Preferably a disk holder of said bottom, By being attached to a movable valve body of said bottom, enabling free attachment and detachment, and inserting said disk holder in a central hole of said disc substrate as much as possible densely, Said disc substrate is positioned to a movable valve body of said bottom, and alignment at the time of pasting together a disc substrate of aforementioned one side and another side is made.

[0023] It has further disk test equipment which conducts a predetermined inspection preferably to said disk by which curing treatment was carried out with said adhesive setting device, and a disk accumulation apparatus which accumulates said disk inspected by this disk test equipment.

[0024] This invention equips with the following a substrate feeder which supplies a disc substrate of aforementioned one side and another side, in order to paste together one disc substrate and a disc substrate of another side with adhesives and to manufacture a disk.

While supplies said one disc substrate and it is a substrate feed zone.

A substrate feed zone of another side which supplies a disc substrate of said another side.

A rotating table which rotates a substrate feed zone of a preparation, aforementioned one side, and another side, respectively, Two or more poles which it is allocated by said rotating table on the same circumference, and said two or more disc substrates are inserted in it, and are stored in it, A lifter arm delivered to a substrate transport device for raising one in said disc substrate inserted in said each pole along with said pole, and conveying said disc substrate. [two or more]

[0025] A substrate feed zone of aforementioned one side and another side has further preferably an electrostatic blowing device which static electricity is removed from an adhesive application side of said disc substrate, and is defecated, respectively.

[0026] In order to paste together one disc substrate and a disc substrate of another side with adhesives and to manufacture a disk, this invention, In a substrate transport device which said one disc substrate is conveyed from a substrate feeder to one low-speed spin part, and conveys a disc substrate of said another side from said

substrate feeder to a low-speed spin part of another side, A transportation arm which is having steadily the function to hold said one disc substrate, A transportation arm of another side which has the function to hold a disc substrate of said another side, The axis of rotation in which an adhesives supply arm in which a nozzle which carries out the regurgitation of said adhesives was provided, said one transportation arm, a transportation arm of said another side, and all the arms of said adhesives supply arm were attached, A preparation, conveying operation of said one disc substrate from said substrate feeder to said one low-speed spin part, Conveying operation of a disc substrate of said another side from said substrate feeder to a low-speed spin part of said another side, And repetitive rotating operation of said axis of rotation was made to perform alignment operation which locates said nozzle in either said one low-speed spin part or a low-speed spin part of said another side selectively.

[0027]

[Embodiment of the Invention] Hereafter, the substrate feeder and substrate transport device which constitute the disk manufacturing installation by one embodiment of this invention and a part of this disk manufacturing installation are explained with reference to Drawings.

[0028] The disk manufacturing installation by this embodiment is a disk manufacturing installation which pastes together one disc substrate and the disc substrate of another side, and manufactures a disk with adhesives.

[0029] Drawing 1 is a top view showing the outline of the entire configuration of this device, as shown in drawing 1, while supplies one disc substrate Da and this device is provided with the substrate feeder 1 which has the substrate feed zone 1a and the substrate feed zone 1b of another side which supplies the disc substrate Db of another side. On the other hand, reach and the substrate feed zones 1a and 1b of another side, respectively The disc substrate Da, Have the electrostatic blowing devices 64a and 64b which static electricity is removed from the adhesive application side of Db, and are defecated, and the electrostatic blowing devices 64a and 64b, By spraying the ionized gas on the disc substrate Da and the adhesive application side of Db, static electricity is removed from an adhesive application side, and the particle adhering to an adhesive application side is removed.

[0030] The low-speed spin part 4a which is giving adhesives steadily to ring shape on the surface while this device carries out the low speed rotary of one disc substrate Da, The surface is equipped with the low-speed spinning device 4 which has the low-speed spin part 4b of another side which gives adhesives to ring shape, carrying out the low speed rotary of the disc substrate Db of another side. The disc substrate Da of one side from

the substrate feeder 1 to the low-speed spinning device 4 and another side and conveyance of Db are performed by the 1st conveying machine 3.

[0031]The high-speed spin part 7a which carries out the high velocity revolution of the disc substrate Da, and while adhesives were given to this device by one low-speed spin part 4a makes distribute adhesives steadily uniformly. It has the high-speed spinning device 7 which has the high-speed spin part 7b of another side which carries out the high velocity revolution of the disc substrate Db of another side where adhesives were given by the low-speed spin part 4b of another side, and distributes adhesives uniformly.

[0032]The disc substrate Da of one side from the low-speed spinning device 4 to the high-speed spinning device 7 and another side and conveyance of Db are performed by the 2nd conveying machine 6. On the other hand, this 2nd conveying machine 6 reached, and is provided with the disc substrate Da of another side, and the transferring arms 6a and 6b of the couple which holds and carries out the rotary transfer of the Db.

[0033]This device is provided with the laminating apparatus 10 to which while was uniformly distributed by one high-speed spin part 7a, and adhesives paste together the disc substrate Da and the disc substrate Db of another side where adhesives were uniformly distributed by the high-speed spin part 7b of another side under a reduced pressure state by it.

[0034]Conveyance of one disc substrate Da from one high-speed spin part 7a to the laminating apparatus 10, It is performed by the reversal transferring arm (one transportation part) 9, and this reversal transferring arm 9 is conveyed to the laminating apparatus 10, while having taken out from one high-speed spin part 7a, and reversing the disc substrate Da. Conveyance of the disc substrate Db of another side from the high-speed spin part 7b of another side to the laminating apparatus 10, It is performed by the transferring arm (transportation part of another side) 8, and this transferring arm 8 is conveyed to the laminating apparatus 10, without reversing the disc substrate Db of another side taken out from the high-speed spin part 7b of another side. The 3rd conveying machine 17 is constituted by the reversal transferring arm 9 and the transferring arm 8.

[0035]Signs that the adhesives with which drawing 2 was breathed out from the adhesives regurgitation nozzle 5 in the time series toward right-hand side from the left-in-the-figure side are given to ring shape by the low-speed spinning device 4, Signs that the adhesives given to ring shape are uniformly distributed by the high-speed spinning device 7, and signs that the disc substrate Da of a couple and Db(s) are stuck inside the vacuum housing 30 of a reduced pressure state are shown.

[0036]This device is provided with the following as shown in drawing 1.

The disk pressurizer 11 which reaches on the other hand and pressurizes the disc substrate Da of another side, and the disk which pasted Db together with the laminating apparatus 10 and formed it from the both sides.

The adhesive setting device 12 which makes the adhesives of the disk pressurized with this disk pressurizer 11 irradiate with and harden ultraviolet rays.

Conveyance to the disk pressurizer 11 of the disk after pasting and conveyance of the disk from the disk pressurizer 11 to the adhesive setting device 12 are performed when the bottom solid of revolution 26 which constitutes some laminating apparatus 10 rotates with a disk.

[0037]This device receives the disk by which curing treatment was carried out with the adhesive setting device 12, It has the disk test equipment 13 which conducts an inspection predetermined [such as a thickness inspection of adhesives,], and the disk accumulation apparatus 60 which accumulates the disk inspected by the disk test equipment 13, and the disk accumulation apparatus 60 comprises the 1st stacker 15 and 2nd stacker 16.

[0038]Conveyance of the disk from the adhesive setting device 12 to the disk test equipment 13, After the bottom solid of revolution 26 which constitutes some laminating apparatus 10 rotates with a disk, it is carried out by receiving a disk and transporting even the disk test equipment 13 by the rotational operation of the transferring arm 14 by the transferring arm 14. Conveyance of the disk from the disk test equipment 13 to the disk accumulation apparatus 60 is also performed by the rotating operation of the transferring arm 14.

[0039]Drawing 3 (a) and (b) is the front view and top view of the substrate feed zone 1a (or 1b) of the substrate feeder 1, as shown in drawing 3, the substrate feed zone 1a (or 1b) is provided with the motor 52 installed on the base plate 57, and the rotating table 53 rotates it by this motor 52. The pole 54 of plurality (this embodiment 6) is allocated by the rotating table 53 in the equiangular distance on the same circumference, and the color 56 is formed in each pole 54 so that rise and fall are possible. The substrate feed zone 1a (or 1b) is provided with the color rise-and-fall part 55, and is provided with the lifter arm 58 in which longitudinal slide movement is [that this color rise-and-fall part 55 can be gone up and down and] possible.

[0040]If many disc substrates Da (or Db) are stored in each pole 54 and the desired pole 54 is transported to the position of the lifter arm 58 by the rotating operation of the rotating table 53, The lifter arm 58 moves forward, the color 56 is held, it goes up with the disc substrate Da (or Db) of one sheet, and the disc substrate Da (or Db) is supplied to the position in which substrate extraction is possible. The gas ionized with the

electrostatic blowing device 64a (or 64b) is sprayed on the adhesive application side of the disc substrate Da (or Db), and removal of static electricity and particle is made.

[0041]If the pole 54 becomes empty, it will retreat, the lifter arm 58 will be dropped, the rotating table 53 will be rotated by the motor 52, and the following pole 54 will be arranged into the position of the lifter arm 58.

[0042]As drawing 4 (a), (b), and (c) is a side view showing the 1st conveying machine 3, a front view, and the figure which looked at (a) from the top and it was shown in drawing 4, the 1st conveying machine 3, It has the axis of rotation 50 rotated by the motor 51 and this motor 51, The three transportation arms 46, 47, and 48 are allocated by the axis of rotation 50, and the adsorption attaching part 45 which adsorbs the spacer formed between the disc substrate Da, Db, or disc substrates is formed at the tip of each transportation arms 46, 47, and 48, respectively.

[0043]The adhesives supply arm 49 with which the adhesives regurgitation nozzle 5 which carries out the regurgitation of the adhesives was formed at the tip is formed in the axis of rotation 50. The three transportation arms 46, 47, and 48 and adhesives supply arms 49 are allocated by the axis of rotation 50 in the equiangular distance of 90 degrees, and the adhesives regurgitation nozzle 5 and the transportation arm 47 for spacers are arranged on the same diagonal line.

[0044]And the conveying operation of one disc substrate Da from one substrate feed zone 1a to one low-speed spin part 4a, The repetitive rotating operation of the axis of rotation 50 can perform all of the conveying operation of the disc substrate Db of another side from the substrate feed zone 1b of another side to the low-speed spin part 4b of another side, and the alignment operation in which the adhesives supply nozzle 5 is selectively located in either of the low-speed spin parts 4a and 4b of one side or another side. The spacer collected by the transportation arm 47 is accumulated by the spacer accumulation apparatus 2 shown in drawing 1.

[0045]Drawing 5 is a front view showing the laminating apparatus 10, drawing 6 is a perspective view showing the vacuum housing 30 which constitutes some laminating apparatus, and drawing 7 is an exhaust air Bent distribution diagram of a laminating apparatus.

[0046]As shown in drawing 5, the laminating apparatus 10 is provided with the vacuum housing 30 which comprises a hollow member, and as shown in drawing 6, the vacuum housing 30 has the openings 31 and 32 of the couple which estranges mutually and counters a sliding direction.

[0047]The laminating apparatus 10 is provided with two or more upper part movable valve bodies 22 which may blockade the upper part opening 32 of the vacuum housing

30 from the outside, and is formed in the medial surface of each upper part movable valve body 22, enabling free up-and-down motion of each upper part disk holder 23 holding the disc substrate Da. The rise-and-fall drive of the upper part movable valve body 22 is carried out by the upper part valve driving 19, and the rise-and-fall drive of the upper part disk holder 23 is carried out independently [the upper part movable valve body 22] by the upper part electrode-holder drive mechanism 20.

[0048]And the plurality of the upper part assembly 61 which comprises the upper part movable valve body 22, the upper part disk holder 23, and the upper part electrode-holder drive mechanism 20, With the upper part solid-of-revolution drive mechanism 18 which comprises a motor, it is arranged on the same circumference, is attached to the upper part solid of revolution 21, rotate this upper part solid of revolution 21, and by this, One of two or more upper part movable valve bodies 22 can be selectively located above the upper part opening 32 of the vacuum housing 30.

[0049]The laminating apparatus 10 is provided with two or more bottom movable valve bodies 27 which may blockade the lower opening 31 of the vacuum housing 30 from the outside, and each bottom disk holder 28 holding the disc substrate Db is formed in the medial surface of each bottom movable valve body 27. The rise-and-fall drive of the bottom movable valve body 27 located under the lower opening 31 is carried out by the bottom valve driving 25 formed in the base plate 63.

[0050]The bottom disk holder 28 is inserted in the central hole of the disc substrate Db as much as possible densely, and, thereby, the disc substrate Db is positioned to the bottom movable valve body 27. This bottom disk holder 28 is attached to the bottom movable valve body 27, enabling free attachment and detachment, and the bottom movable valve body 27 is equipped with the bottom disk holder 28 in which thickness differs suitably according to the inside diameter of the central hole of the disc substrate Db.

[0051]And the plurality of the bottom assembly 62 which comprises the bottom movable valve body 27 and the bottom disk holder 28, With the bottom solid-of-revolution drive mechanism 24 which comprises a motor, it is arranged on the same circumference, is attached to the bottom solid of revolution 26, rotate this bottom solid of revolution 26, and by this, It is a lower part of the lower opening 31 of the vacuum housing 30 selectively, and one of two or more bottom movable valve bodies 27 can be located above the bottom valve driving 25. Like the above, the disc substrate Db is positioned to the bottom movable valve body 27 with the bottom disk holder 28, and, thereby, the alignment at the time of pasting the disc substrate Da and the disc substrate Db together is made. The bottom solid-of-revolution drive mechanism 24 is formed in the

base plate 63.

[0052]As shown in drawing 6, the upper part opening 32 and the lower opening 31 which estrange the vacuum housing 30 of each other and counter are formed, between the double door regio oralis 32 and 31, it is connected by the cylindrical member 33 and the communicating hole 34 is formed in this cylindrical member 33.

[0053]This device is provided with the exhauster style 35 which exhausts the inside of the vacuum housing 30 in the state where the upper part and the lower openings 32 and 31 were blockaded by the upper part and bottom movable valve bodies 22 and 27, and is made into a reduced pressure state as shown in drawing 7. The exhauster style 35 is provided with the following.

The exhaust valve 37 provided in the portion of the left-hand side tie-down plate 36 of the vacuum housing 30 as shown in drawing 6.

The oil sealed rotary pump 44 connected to the exhaust line 41.

Pirani vacuum gauge 40 is formed in the right-hand side tie-down plate 39.

[0054]The vent mechanism 43 in which the reduced pressure state of the vacuum housing 30 is canceled is formed, and this vent mechanism 43 is provided with the vent valve 38 provided in the portion of the left-hand side tie-down plate 36. This vent valve 38 is located in the middle of the vent line 42 which branched from the middle of the exhaust line 41.

[0055]And when reaching on the other hand inside the vacuum housing 30 and pasting the disc substrate Da of another side, and Db(s) together. On the other hand, the upper part and the bottom disk holders 23 and 28 which were provided in the inner surface side of the upper part and bottom movable valve bodies 22 and 27 are attained to using the reversal transferring arm 9 and the transferring arm 8 which were shown in drawing 1, and are equipped with the disc substrate Da of another side, and Db.

[0056]Next, the upper part and the lower openings 32 and 31 which were formed in the vacuum housing 30 are blockaded by the upper part and bottom movable valve bodies 22 and 27 from those outsides, thereby, each disc substrate Da and the adhesion sides of Db are estranged, and they are made to counter inside the vacuum housing 30.

[0057]The inside of the vacuum housing 30 is exhausted by the exhauster style 35 in this state, it is considered as a reduced pressure state, the upper part disk holder 23 is caudad moved with the upper part electrode-holder drive mechanism 20, and each disc substrate Da and the adhesion sides of Db are joined inside the vacuum housing 30 in a reduced pressure state.

[0058]Here, as for the degree of vacuum inside the vacuum housing 30 at the time of lamination, it is preferred that it is 20 Pa or less.

[0059]As a modification, the bottom disk holder 28 is also attached to the bottom movable valve body 27, enabling free movement, and electrode holder drive mechanism is formed also in the bottom movable valve body 27, and the bottom disk holder 28 can also be simultaneously driven with the upper part disk holder 23.

[0060]Making the disc substrate Da and the disk which pasted together and formed Db hold to the bottom disk holder 28, when the disc substrate Da and the lamination of Db are completed. The upper part disk holder 23 is raised with the upper part electrode holder drive mechanism 20, With the vent mechanism 43, the reduced pressure state of the vacuum housing 30 is canceled, after an appropriate time, the upper part and bottom movable valve bodies 22 and 27 are pulled apart from the upper part and the lower openings 32 and 31, and the upper part, the bottom disk holders 23 and 28, and a disk are pulled out from the inside of the vacuum housing 30.

[0061]The disk held at the bottom disk holder 28 is carried to the disk pressurizer 11 by the rotating operation of the bottom solid of revolution 26. The disk pressurizer 11 unites with the bottom movable valve body 27, where a disk is held inside, it forms a closed space, by filling up this closed space with high pressured fluid (high voltage air), pressurizes a disk and makes thickness of adhesives uniform.

[0062]The disk by which pressure treatment was carried out with the disk pressurizer 11 is carried to the adhesive setting device 12 by the rotating operation of the bottom solid of revolution 26. In this embodiment, ultraviolet curing adhesives are used as adhesives, and the adhesive setting device 12 irradiates with ultraviolet rays to a disk, and hardens adhesives.

[0063]The disk by which curing treatment was carried out with the adhesive setting device 12 is carried to the disk test equipment 13 by the rotating operation of the bottom solid of revolution 26, and the rotating operation of the transferring arm 14 which received the disk from the bottom disk holder 28. After conducting an inspection predetermined [such as thickness of adhesives,] with this disk test equipment 13, an inspected disk is carried to the disk accumulation apparatus 60 by the rotating operation of the transferring arm 14.

[0064]Since it was made to perform laminating operation of the disc substrate Da and Db(s) under decompressed atmosphere of about 20 Pa or less preferably according to the disk manufacturing installation by this embodiment as stated above, remains of the air bubbles to the inside of adhesives can be prevented.

[0065]According to the disk manufacturing installation by this embodiment, all the complete process cycles to recovery of the manufactured disk from supply of the disc substrate Da and Db are automatable.

[0066]According to the disk manufacturing installation by this embodiment, the substrate feeder 1 The two substrate feed zones 1a, Have 1b and the low-speed spinning device 4 has the two low-speed spin parts 4a and 4b, The high-speed spinning device 7 has the two high-speed spin parts 7a and 7b, and each devices 1, 4, and 7 can deal with simultaneously one disc substrate Da and the disc substrate Db of another side. By head for the first time in operation of the adhesives supply arm 49, the one adhesives regurgitation nozzle 5 to the two low-speed spin parts 4a, Since could distribute adhesives by turns, they could be supplied to 4b, the low-speed spinning device 4 and the high-speed spinning device 7 were formed further and the grant stage and distributed stage of adhesives were separated, the tact time of an adhesive application can be shortened substantially.

[0067]According to the disk manufacturing installation by this embodiment, the upper part and the bottom disk holders 23 and 28 are formed in the upper part and bottom movable valve bodies 22 and 27, By the upper part and bottom movable valve bodies 22 and 27, the upper part and the lower openings 32 and 31 of the vacuum housing 30 are blockaded so that opening is possible, Since the disc substrate Da and Db which should be stuck by this were located in the vacuum housing 30 and the inside of the vacuum housing 30 was airtightly isolated from the exterior, It is possible to perform set of the disc substrate Da and Db stuck and removal of the stuck disk in the exterior of the vacuum housing 30, In the space where one stage in a vacuum housing was restricted like the conventional disk manufacturing installation, a disk set, Compared with the case where removal of lamination and a lamination disk etc. are performed, the tact time of the laminating operation of a disk can be shortened substantially, and a disk manufacturing process is easily automatable.

[0068]According to the disk manufacturing installation by this embodiment, two or more upper parts and bottom disk holders 23 and 28 are formed in each of the upper part solid of revolution 21 and the bottom solid of revolution 26, In parallel to the disc substrate Da within the vacuum housing 30, and lamination processing of Db, set the following disc substrate Da to the empty upper part disk holder 23, and. A disk [finishing / lamination] is taken out from the bottom disk holder 28, and since the disc substrate Db was set to the bottom disk holder 28 which became empty, the tact time of the laminating operation of a disk can be shortened further.

[0069]According to the disk manufacturing installation by this embodiment, allocate two or more poles 54 in the rotating table 53 of the substrate feeder 1, and two or more disc substrates Da (or Db) are inserted in each pole 54, Since the pole 54 was chosen by rotation of the rotating table 53 and it was made to raise the disc substrate Da (or Db)

by the lifter arm 58, Many disc substrates Da (or Db) can be stored, and the disc substrate Da (or Db) which defecated the adhesive application side with the electrostatic blowing device 64a (or 64b) can be supplied continuously.

[0070]According to the disk manufacturing installation by this embodiment, to the one axis of rotation 50 of the 1st conveying machine 3. The three transportation arms 46, 47, and 48 and adhesives supply arms 49 are allocated, The conveying operation of one disc substrate Da from one substrate feed zone 1a to one low-speed spin part 4a, The conveying operation of the disc substrate Db of another side from the substrate feed zone 1b of another side to the low-speed spin part 4b of another side, And since the repetitive rotating operation of the axis of rotation 50 can perform all the alignment operations that locate the adhesives supply nozzle 5 in either of the low-speed spin parts 4a and 4b of one side or another side selectively, the miniaturization of the whole disk manufacturing installation can be attained.

[0071]

[Effect of the Invention]Since it was made to perform laminating operation of the disc substrates by a laminating apparatus under a decompressed atmosphere according to the disk manufacturing installation by this invention as stated above, it is possible to prevent remains of the air bubbles to the inside of adhesives. A low-speed spinning device gives the adhesives to a disc substrate, and a high-speed spinning device is made to perform uniform dispersion of adhesives, and. Since each of a low-speed spinning device and a high-speed spinning device can process the disc substrate of the couple stuck simultaneously, the tact time of the uniformly coating of the adhesives to each disc substrate can be shortened.

[0072]According to the substrate feeder by this invention, allocate two or more poles in a rotating table, and two or more disc substrates are inserted in each pole, Since the pole was chosen by rotation of a rotating table and it was made to raise a disc substrate by a lifter arm, many disc substrates can be stored and a disc substrate can be supplied continuously.

[0073]According to the substrate transport device by this invention, the conveying operation of one disc substrate from a substrate feeder to one low-speed spin part, The conveying operation of the disc substrate of another side from a substrate feeder to the low-speed spin part of another side, And since the repetitive rotating operation of the axis of rotation was made to perform alignment operation which locates in either one low-speed spin part or the low-speed spin part of another side selectively the nozzle which carries out the regurgitation for adhesives, the miniaturization of a substrate transport device can be attained.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1]The top view showing the entire configuration of the disk manufacturing installation by one embodiment of this invention.

[Drawing 2]The explanatory view for explaining the outline of the manufacturing method of the disk by the disk manufacturing installation shown in drawing 1.

[Drawing 3]It is a figure showing the substrate feed zone of the substrate feeder of the disk manufacturing installation shown in drawing 1, and as for (a), it is a front view and (b) is a top view.

[Drawing 4]It is the figure with which it was a figure showing the 1st conveying machine of the disk manufacturing installation shown in drawing 1, and (a) looked at the side view, (b) looked at the front view, and (c) looked at (a) from the top.

[Drawing 5]The front view showing the laminating apparatus of the disk manufacturing installation shown in drawing 1.

[Drawing 6]The perspective view showing the vacuum housing of the laminating apparatus of the disk manufacturing installation shown in drawing 1.

[Drawing 7]The exhaust air Bent distribution diagram of the laminating apparatus of the disk manufacturing installation shown in drawing 1.

[Drawing 8]The explanatory view for explaining an example of the conventional disk manufacturing method.

[Drawing 9]The explanatory view for explaining other examples of the conventional disk manufacturing method.

[Drawing 10]The explanatory view for explaining an example of further others of the conventional disk manufacturing method.

[Description of Notations]

1 Substrate feeder

1a One substrate feed zone

1b The substrate feed zone of another side

2 Spacer accumulation apparatus

3 The 1st conveying machine

4 Low-speed spinning device

4a One low-speed spin part

4b The low-speed spin part of another side

5 Adhesives regurgitation nozzle

6 The 2nd conveying machine
6a, 6b transferring arm
7 High-speed spinning device
7a One high-speed spin part
7b The high-speed spin part of another side
8 Transferring arm (transportation part of another side)
9 Reversal transferring arm (one transportation part)
10 Laminating apparatus
11 Disk pressurizer
12 Adhesive setting device
13 Disk test equipment
14 Transferring arm
15 The 1st stacker
16 The 2nd stacker
17 The 3rd conveying machine
19 Upper part valve driving
20 Upper part electrode holder drive mechanism
21 Upper part solid of revolution
22 Upper part movable valve body
23 Upper part disk holder
24 Bottom solid of revolution drive mechanism
25 Bottom valve driving
26 Bottom solid of revolution
27 Bottom movable valve body
28 Bottom disk holder
30 Vacuum housing
31 The lower opening of a vacuum housing
32 The upper part opening of a vacuum housing
35 Exhauster style
43 Vent mechanism
45 Adsorption attaching part
49 Adhesives supply arm
50 Axis of rotation
51 and 52 Motor
53 Rotating table
54 Pole

55 Color rise-and-fall part
56 Color
58 Lifter arm
60 Disk accumulation apparatus
61 Upper part assembly
62 Bottom assembly
63 Base plate
Da One disc substrate
Db Disc substrate of another side